Table 5. Summary of potential ram harvest under different population parameters and criteria.

PRAIRIE/ MOUNTAIN-FOOTHILLS	Number of ES or Legal Ram Licenses Is	When the Herd Has		
		Population Size	Ram: 100 Ewe ratio	% of Rams with ≥ ¾ curl
Standard Regulation	Up to 15% of the ¾-curl rams	± 10% of 250	40-60:100	≥ 30
Restrictive Regulation	Up to 10% of the ¾-curl rams	More than 10% below 250	< 40:100	< 30
Liberal Regulation_	Up to 20% of the ¾-curl rams	Greater than 10% above 250	> 60:100	≥ 30

Restrictive Regulations: Limited-entry through issuing either-sex licenses with the number of either-sex licenses issued being up to 10% of the ¾-curl rams in the population.

The Restrictive Regulation will be recommended if: The population is more than 10% below the population objective of 250, there are less than 40 rams: 100 ewes, and less than 30% of the rams are at least ¾-curl.

Liberal Regulation: Limited-entry through issuing either-sex licenses with the number of either-sex licenses issued being up to 20% of the ¾-curl rams in the population.

The Liberal Regulation will be recommended if: The population is more than 10% above the objective of 250, there are more than 60 rams: 100 ewes, and more than 30% of the rams are at least ¾-curl.

BOULDER
(Hunting District 500)

Description: Hunting District 500 begins nearly 40 miles south of Big Timber, contains approximately 159,479 acres (250mi²) of terrain, and is in the Southern Mountains Ecological Region. With the exception of several small mining claims totaling less than 718 acres, the district is managed by the Gallatin National Forest as part of the Absaroka-Beartooth Wilderness. The headwaters of the Main Boulder River and Slough Creek as well as tributaries of the Stillwater River originate within the district. Numerous mountain peaks ranging from 9,000 to 11,000 feet rise above cirque lake basins and scattered forests of whitebark pine and spruce. Bighorn sheep range over a large portion of the district from lower-elevation habitat to high-elevation ridges and saddles in the summer and fall. Sheep are restricted to high-elevation windblown ridgetops and mountain peaks during the harsh winters.

While the winter range for the Stillwater bighorns is found outside the hunting district boundary, it will be described here because it contributes rams to the Hunting District 500 hunt area. The Stillwater winter range is the only low-elevation winter range in the Beartooth Mountains, lying between 5,200 feet and 5,800 feet in elevation. It is located along the Stillwater River about five miles southwest of Nye. This winter range is in the Chinook zone where nearly constant winds keep the ground free of snow. Traditionally the winter range was a bluebunch wheatgrass/Idaho fescue type. However, in recent years the native range has been abandoned in favor of reclaimed mining land belonging to Stillwater Mining Company (SMC). Some satellite winter ranges occur along the West Fork of the Stillwater and on Sheep Mountain.

Public Access: Hunting District 500 provides a good diversity of hunting experiences, including limited motorized hunting access on ATV trails with walk-in or horseback hunting in the interior.

Bighorn Sheep Populations: Sheep from three different populations may be found within the boundary of Hunting District 500 during summer and fall, including rams from the Stillwater herd; the Monument Peak herd, which is resident to the upper Boulder area; and sheep associated with Yellowstone National Park winter ranges, who spend part of the summer and fall months within the hunting district. The Monument and Yellowstone herd units are composed entirely of native sheep and have never been augmented with transplanted sheep from other areas. The Stillwater herd was augmented twice with rams. In 1970, two rams were relocated from the Sun River herd.

They disappeared shortly after placement in the Stillwater. In 1984, three rams were placed on the Stillwater winter range from the National Bison Range just before the rut. These rams isolated themselves from the native sheep during the rut that year and were gone from the area by the next year, so they did not make a genetic contribution to the population.

The Stillwater sheep population ranged from 50 to 60 sheep throughout the mid-1970s and early 1980s but dropped below 40 in the mid-1980s and averaged less than 30 sheep on winter range from 1989 to 1999 (Figure 1). However, there has been a significant increase in bighorn numbers in the last few years. This increase is largely the result of increased lamb production and survival, which in turn is likely the result of younger, more productive ewes making up the majority of the ewe population. If this trend continues, this herd may be well on its way to recovery, at least in the short term. Maximum counts of bighorns in each sex and age class indicated that there were a minimum of 46 bighorns on the Stillwater winter range in December 2006. These included 12 rams (two yearlings), 25 ewes (one yearling) and nine lambs for ratios of 42 adult rams and 38 lambs: 100 adult ewes (Table 1). The 2005-06 count was somewhat below the 2004-05 count of 53 sheep. However, due to the mild winter conditions in 2006, it is extremely unlikely that all of the sheep were present on the winter range. By comparing the sex and age structure of the 2004-05 population, and the 2005-06 population it appeared that we were missing three prime-aged rams and five adult ewes. Given the lush growth conditions of the 2005 growing season and the mild winter of 2006, it seems unlikely we could lose this many adult animals since no deaths were documented on the winter range. Thus, it is not unreasonable to suggest that there could have been another five to eight adults in the population in 2006. Those adult ewes could also have had another two or three lambs. It is quite possible that this population was approaching 60 sheep in 2006.

Sheep numbers on the upper Boulder (Monument Peak) winter range increased steadily from 16 sheep in 1999 to 42 sheep in 2006 (Figure 2). The 2004 count of 37 sheep and the 2006 count were the two highest counts ever recorded in this district (Table 2). It is interesting to note that the high counts of the early 1980s came following a period of five years in which a domestic sheep allotment located in the area had been inactive for four of those five years. The allotment was used annually from 1985 to 1996, and from 1985 to 1999, winter range counts typically accounted for fewer than 20 sheep. The domestic sheep allotment has been inactive since 1996 and was officially retired by the U.S. Forest Service (USFS) in 2006.

Bighorn sheep in this area winter at elevations in excess of 10,000 feet. Deep snow confines sheep to windblown ridgetops with extremely limited forage. Escape cover consists of rocky outcroppings, ledges, and cliffs. There are some potential winter range areas west of Boulder Pass that are presently unoccupied, but it is unlikely that this bighorn herd will ever grow much beyond 40 to 50 animals.

In the Lower Boulder River drainage another population of bighorn was established beginning in 1985 with a transplant of 23 sheep from Lost Creek and Rock Creek. Subsequent transplants continued in 1987 with the release of 12 sheep from Lost Creek and 7 sheep from Upper Rock Creek, an additional 26 sheep from Perma in 1995 and 30 sheep from Upper Rock Creek in 1997. Shortly after the last transplant a band of domestic sheep were moved into the vicinity

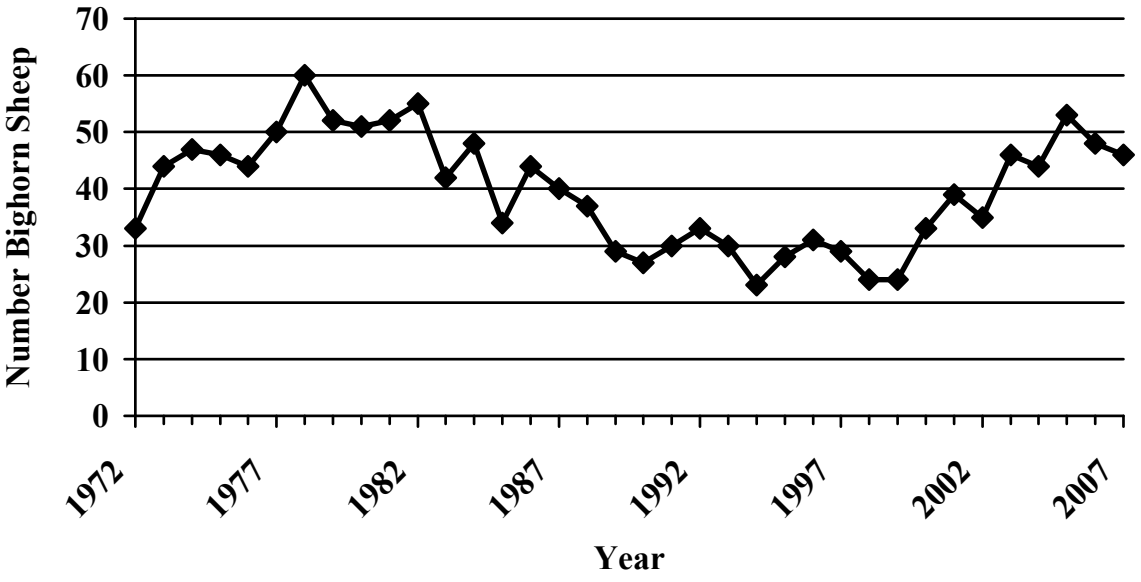

Figure 1. Total number of bighorn sheep observed during trend surveys on the Stillwater winter range, Hunting District 500, 1972-2007.

Table 1. Total number and classification of bighorn sheep on the Stillwater winter range, Hunting District 500,1971-2007.

Year	Total	Rams		Ewes		Lambs	Lambs/100 Ad Ewes	Yrlg/100 Ad Ewes	% Yrlg Survival	Rams/100 Ad Ewes
		Ad	Yrlg	Ad	Yrlg					
1972	33	3	1	17	1	11	65	12	-	18
1973	44	3	5	18	4	14	78	50	82	17
1974	47	5	2	18	7	15	83	50	64	28
1975	46	4	3	22	6	11	50	41	60	18
1976	44	5	2	27	1	9	33	11	27	19
1977	50	5	6	25	2	12	48	32	89	20
1978	60	8	5	27	4	16	59	33	75	30
1979	52	9	3	24	1	15	60	17	25	38
1980	51	11	6	24	2	8	33	33	53	46
1981	52	13	1	24	3	11	46	17	50	54
1982	55	13	5	24	2	11	46	29	64	54
1983	42	14	2	18	2	6	33	22	36	77
1984	48	14	9	18	1	6	33	55	167	78
1985	34	9	1	18	1	5	28	11	33	50
1986	44	7	3	26	2	6	23	19	100	27
1987	40	9	2	15	3	11	73	33	100	60
1988	37	6	2	24	2	3	12	17	80	25
1989	29	6	0	22	0	1	5	0	0	27
1990	27	5	0	17	1	4	24	6	100	29
1991	30	5	1	18	2	4	22	17	100	28
1992	33	5	2	19	1	6	32	16	100	26
1993	30	6	1	17	3	3	18	24	67	35
1994	23	3	1	12	1	6	50	17	67	25
1995	28	4	1	13	3	7	54	31	80	31
1996	31	5	2	14	3	7	50	36	71	36
1997	29	4	3	13	1	8	62	31	67	31
1998	24	5	2	10	2	5	50	40	57	50
1999	24	7	0	11	0	6	55	0	0	64
2000	33	7	2	13	4	7	54	46	100	54
2001	39	10	3	16	1	9	56	25	57	62
2002	35	10	2	17	2	4	24	24	50	59
2003	46	10	1	18	3	14	78	29	100	56
2004	44	10	1	20	5	8	40	30	43	50
2005	53	10	3	25	4	11	40	28	88	44
2006	48	10	2	22	2	10	45	18	36	45
2007	46	10	2	24	1	9	38	12	33	42

of the bighorn sheep. A die-off of these sheep began in 1999 and continued in 2000. Prior to the onset of the die-off there were an estimated 100 bighorn sheep in the population and a new hunting district (504) was created in 2000 with 1 legal ram permit issued. In 2001, there were no remaining bighorn sheep and the hunting district was closed.

Recreation Provided: Only a small number of hunting districts in Montana and the United States offer unlimited sheep hunting opportunity. The rugged habitat combined with relatively small sheep populations scattered over a large area produce a challenging hunt, well suited for an unlimited-opportunity, quota-regulated harvest. Sheep are found entirely on USFS land with access opportunities ranging from ATV-accessible areas outside the wilderness boundary, to areas accessible only by foot or horseback both inside and outside the wilderness. The non-hunting public also enjoys the opportunity to observe bighorn sheep in a high-elevation, pristine mountain setting.

Current Annual Bighorn Sheep Harvest: Due to the extremely low numbers of bighorns on the Stillwater winter range, the hunting season was closed in this district from 1991 to 1993. In 1994, new hunting district boundaries were drawn for Hunting District 500. This was done in such a way as to eliminate the seasonal ranges of the Stillwater bighorn herd from the open hunting area and yet allow hunting opportunity on bighorns from other herds that occasionally occupied the western-most portions

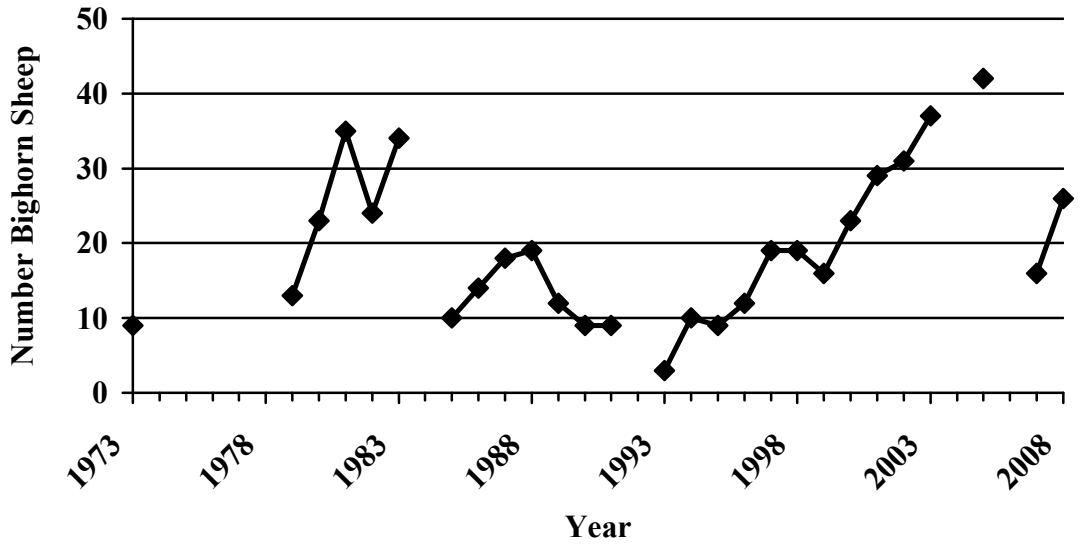

Figure 2. Total number of bighorn sheep observed during trend surveys on the Monument Peak winter range, Hunting District 500, 1973-2008.

Year	Rams		Total Rams	Ewes	Lambs	Unclass	Total	Lambs:100 Ewes	Rams:100 Ewes
	<3/4 Curl	>3/4 curl							
1973	2	0	2	5	2	0	9	0.40	0.40
1979	2	1	3	4	0	6	13	0.00	0.75
1980	2	0	2	4	0	17	23	0.00	0.50
1981	3	0	3	6	0	26	35	0.00	0.50
1982	4	1	5	17	2	0	24	0.12	0.29
1983	8	1	9	19	6	0	34	0.32	0.47
1985	4	0	4	6	0	0	10	0.00	0.67
1986	2	0	2	7	5	0	14	0.71	0.29
1987	5	3	8	7	3	0	18	0.43	1.14
1988	4	2	6	6	5	2	19	0.83	1.00
1989	2	0	2	7	3	0	12	0.43	0.29
1990	1	0	1	7	1	0	9	0.14	0.14
1991	1	0	1	6	2	0	9	0.33	0.17
1993	1	0	1	1	1	0	3	1.00	1.00
1994	2	0	2	6	2	0	10	0.33	0.33
1995	0	2	2	6	1	0	9	0.17	0.33
1996	1	0	1	7	4	0	12	0.57	0.14
1997	2	1	3	12	4	0	19	0.33	0.25
1998	3	2	5	12	2	0	19	0.17	0.42
1999	4	2	6	7	3	0	16	0.43	0.86
2000	4	2	6	10	7	0	23	0.70	0.60
2001	2	2	4	16	9	0	29	0.56	0.25
2002	4	2	6	10	3	12	31	0.30	0.60
2003	7	0	7	24	6	0	37	0.25	0.29
2005	8	3	11	20	11	0	42	0.55	0.55
2007	2	0	2	12	2	0	16	0.17	0.17
2008	3	1	4	18	4	0	26	0.22	0.22
Average	3.07	0.93	4.00	9.70	3.26	2.33	19.30	0.35	0.47
Min	0	0	1	1	0	0	3	0	0.14
Max	8	3	11	24	11	26	42	1	1.14

Table 2. Total number and classification of bighorn sheep on the Monument Peak winter range, Hunting District 500, 1973-2008.

of old Hunting District 500. Increased numbers of bighorns in the upper Boulder drainage led to a small expansion of the hunting district in 2004 along with an increase in the quota from one legal ram to two legal rams. In 2008, the district was once again expanded, moving a portion of the northern boundary from Wounded Man Creek north to Flood Creek. This change was instituted primarily to increase hunter access and allow hunters to spread out over a larger area within an unlimited district. Through the mandatory check we know that hunters took three rams in 2007, but since the statewide hunter questionnaire survey has not been completed, other comparable data are not available (Table 3).

Accomplishments: Perhaps the most significant management accomplishment has been the successful establishment and use of an unlimited hunt area, which provides any hunter with the opportunity to hunt bighorn sheep, and which only a small number of hunting districts in Montana offer.

Another major accomplishment that will ensure long-term sheep population viability in this area was the elimination of a domestic sheep grazing allotment located on summer and winter bighorn ranges. The Haystack Allotment had been active in the upper Boulder area for many years. This allotment overlapped part of the summer and most of the winter range of the upper Boulder sheep population.

Table 3. Number of licenses issued and subsequent harvest, Hunting District 500, 1975-2007.

Year	Permits Issued	Hunters Hunting	Total Harvest	% Success	Effort
1975	84	66	3	5	132
1976	54	37	2	5	148
1977	31	22	1	4	154
1978	34	19	0	0	-
1979	53	45	2	4	114
1980	78	35	4	11	44
1981	52	42	0	0	-
1982	50	33	1	3	198
1983	88	56	4	7	98
1983*	2	2	2	100	16
1984	47	26	2	8	117
1984*	1	1	1	100	-
1985	52	32	2	6	96
1986	40	21	1	5	189
1987	36	19	2	11	56
1988	25	9	2	22	15
1989	27	22	1	5	97
1990	34	28	0	0	-
1991			Closed		
1992			Closed		
1993			Closed		
1994	33	24	0	0	-
1995	28	22	1	5	120
1996	20	15	0	0	-
1997	14	8	1	12	47
1998	4	3	0	0	-
1999	19	13	1	8	54
2000	2	2	0	0	-
2001	4	4	0	0	-
2002	11	9	1	11	48
2003	8	3	1	33	14
2004	47	25	2	8	59
2005	31	25	1	4	-
2006	26	-	1	-	-
2007	-	-	3	-	-

The allotment has been vacant for the last 10 years, having been used last in 1996. The USFS permanently retired this allotment in 2006. The recent growth in the upper Boulder bighorn sheep population may well be due in part to the lack of competition from domestic sheep on summer and winter range and the removal of any potential disease threat associated with the domestics.

Recovery of the Stillwater bighorn herd from a population low of less than 25 animals to its present size of more than 50 sheep has been dramatic. This recovery has taken the concerted efforts of the SMC, Custer National Forest, (NF) FWP, Montana Department of Environmental Quality, and local private landowners. Efforts have included, but are not limited to, such diverse activities as native range inter-seeding, establishment of a grazing system on the winter range, distribution of medicated apple pulp and medicated salt for lungworm control, seasonal road closures on winter range, and oversight on reclamation seed mix. An informal working group meets biannually to review habitat improvement options available for this bighorn herd.

Management Challenges: High-elevation conditions coupled with extreme weather and rugged habitat make annual population surveys difficult. However, continued monitoring of the Stillwater and Monument Peak herds is essential for guiding ram harvest opportunities in the future. These small sheep populations can fluctuate dramatically from year to year, making it difficult to determine if observed population changes are the result of survey conditions or actual population changes.

In winter, bighorn sheep are restricted to windblown ridgetops by deep snow. Snowmobile activity can be heavy on the established trail system between Box Canyon and the wilderness boundary. During winter helicopter sheep surveys, snowmobile tracks are frequently observed inside the wilderness boundary. Snowmobile activity occurring on ridgetops utilized by sheep during winter may cause increased mortality in wintering sheep through several mechanisms. Snowmobiles may force sheep from forage and cause increased energy expenditure. Snowmobile tracks may also provide a pathway for predators to access sheep normally protected by deep snow. Enforcement of travel restrictions inside and outside the wilderness boundary is essential to ensure winter survival of sheep in this area.

The Stillwater winter range is heavily impacted by mining activity. Most of the present bighorn use is currently on reclamation sites that have no more than a 20-year life expectancy. Further, these reclamation sites are small in size, resulting in relatively high densities of sheep, especially as the population increases. This situation increases the likelihood of a density-related disease outbreak. Bighorns have not used traditional native range in the Stillwater valley for 20 years. As reclamation phases out at the end of mining, the fate of these bighorns will become uncertain.

Population Monitoring: To monitor the Monument Peak bighorn population, aerial surveys are conducted annually using a helicopter. Surveys are conducted in late winter through early spring. Many of these sheep are migratory and start moving off of winter range areas around mid-April, depending on snow conditions. To get a total count for population trend, the surveys must be conducted prior to that time. The entire area occupied by bighorn sheep during winter is flown. Bighorns are counted and classified by age and sex, and rams are classified by horn class.

The Stillwater population can be monitored via ground counts. Typically the best counts come between late December and early January. These counts are typically supplemented by helicopter surveys of the entire area, including satellite winter ranges, to ensure all bighorns are tallied.

Summary of Public Comment

Public comments regarding the bighorn sheep population and its management in this hunting district indicates a high level of support for the current season structure. Both hunters and non-hunters enjoy viewing bighorn sheep in this area.

Management Goal

Manage for a healthy and productive bighorn sheep population with a diverse age structure of rams while increasing total sheep numbers. Coordinate with public land management agencies in the management of bighorn habitat, and provide quality hunter opportunity through unlimited hunting on a quota-based system.

Habitat Objectives

1) Sheep in Hunting District 500 spend the entire year on Forest Service lands. A large percentage of the hunting district lies within the Absaroka-Beartooth Wilderness. No habitat improvements or manipulations will be undertaken in the wilderness area.

2) Maintain the Stillwater winter range in a healthy and productive condition.

Habitat Management Strategies

1) Continue the grazing management strategy on the native winter range on the Custer National Forest and adjacent private lands.

2) Continue working with the SMC to ensure maximum quantity and quality of reclamation available to bighorns.

3) Develop a plan for phasing out reclamation as the life of the SMC mine draws to a close.

4) Evaluate options for drawing bighorns back to traditional winter range.

Game Damage Strategies

Specific game damage problems have not occurred to date and are not anticipated. Bighorn sheep spend the entire year on national forest lands and do not migrate into private lands where game damage could be a problem.

Access Strategies

Based on the current distribution of bighorns during the hunting season, lack of hunter access to these sheep has not been an issue and is not anticipated to be an issue in the future.

Population Objectives

Stillwater Winter Range:

1) Maintain the number of bighorn sheep observed during post-season aerial surveys between 50 and 60 sheep.

Monument Peak Winter Range:

1) Maintain the number of bighorn sheep observed during post-season aerial surveys between 35 and 45 sheep.

Population Management Strategies

Strategies to manage bighorn sheep populations are being based, in part, on how bighorn populations respond demographically within five ecological regions across Montana. Bighorn populations and therefore objectives for the various populations and subsequent monitoring programs vary across Montana and depend largely on the environment or ecological region where they occur. Hunting District 500 is located in the Southern Mountains Ecological Region (see discussion of ecological regions in Chapter 1), which includes high-elevation mountainous habitat throughout much of south-central Montana. Winter range habitat, winter severity, and winter forage conditions are the primary factors limiting this population. During winter the Monument Peak bighorns are confined to narrow bands of habitat on windblown ridgetops and mountain peaks. Forage is extremely limited. To date, overpopulation has not been a concern for this herd. Numbers are maintained at low levels through natural mortality. In contrast, the Stillwater herd winters in the Chinook zone of the Stillwater valley. Here native-vegetation winter ranges have been virtually abandoned while bighorns concentrate their foraging efforts on mine reclamation. Yet in both herds, natural mortality has prevented overpopulation from occurring. This hunting district has supported a harvest of one to two rams: year without reducing population viability.

Prescriptive Harvest Management

Ewes: Bighorn sheep populations are managed where necessary through limited-entry harvest of the female segment. In Hunting District 500, sheep populations have never reached levels that necessitate or could support ewe harvest. Natural regulation through limited winter habitat and forage holds the population at relatively low levels.

Rams: The harvest strategy for rams in this hunting district is to have a quota that is relatively stable over time. This is accomplished by setting the quota equal to the long-term average number of three-year-old rams seen during winter trend counts. These are the rams that will be entering the ¾-curl (legal) age class the following year. This strategy eliminates the need to constantly juggle quotas based on slight variations in recruitment in rams to the legal age class. Following this strategy, the quota for Hunting District 500 can be set at two for the long term, based on the recruitment rate of Stillwater rams to the legal age class.

BEARTOOTH MOUNTAINS, HELLROARING
(Hunting Districts 501 & 502)

Description: The Beartooth and Hellroaring hunting districts (Hunting Districts 501 and 502) of the Beartooth Mountains encompass approximately 1,053mi² with 23% privately owned and 77% managed by various public land management agencies, and are located in the Southern Mountains ecological region. The Beartooth Mountains are one of Montana's largest mountain ranges, running from the Clarks Fork of the Yellowstone River on the east to the Boulder River on the west. This is Montana's highest range of mountains, with many peaks topping out at over 12,000 feet including Montana's highest peak, Granite Peak, at 12,804 feet. Hunting Districts 501 and 502 encompass the eastern two-thirds of the mountain range.

Approximately 300mi² of these hunting districts (28%) are currently occupied by bighorn sheep during some portion of the year. Essentially 100% of the area occupied by bighorns is public land. There are approximately 150mi² of bighorn sheep winter/year-round range in these units. Virtually all of the bighorn habitat is managed by the U.S. Forest Service (USFS) - Custer National Forest (NF) and Gallatin National Forest (NF). The lion's share of the bighorn habitat lies within the Absaroka-Beartooth Wilderness. Only two significant bighorn ranges lie outside the wilderness boundary. Approximately 10mi² of the Hellroaring winter range in Hunting District 502 lies within the Line Creek Plateau Research Natural Area administered by the Custer NF. At the southern edge of Hunting District 501, approximately 25mi² of bighorn summer/fall range lies outside the Absaroka-Beartooth Wilderness on Forest Service land administered by the Gallatin NF.

The winter range for the bighorns in Hunting District 501 is on the alpine plateaus along both sides of the West Rosebud drainage south of Absarokee. These wintering areas range in elevation from slightly over 9,000 feet to in excess of 11,000 feet. During the summer, most of the ewes, lambs, and sub-legal rams from these winter ranges migrate south to the north edge of Yellowstone National Park (YNP) in the vicinity of Cooke City. For the most part, the mature rams do not make this seasonal migration.

The bighorns in Hunting District 502 winter on the alpine plateaus on both sides of the Rock Creek drainage south of Red Lodge. Again, these winter ranges may exceed 11,000 feet in elevation. During the summer, nearly all of these sheep migrate into the Pilot/Index Peak/Cache Creek area of northern Wyoming and YNP. Typically these bighorns do not return to the winter range until at least mid-October. Rams that spend part of the winter in the Rock Creek drainage also spend all or part of the rut in the Clark's Fork Canyon in Wyoming.

Public Access: Excellent access is available to all portions of these bighorn hunting districts. Given the wilderness nature of these areas, most access is by foot or horseback. The steepness of the terrain dictates that horse use is limited to major drainages. The steep canyon walls and limited vegetation for horse feed generally precludes the use of horses in many of the areas frequented by bighorns. Vehicle access is limited to the Beartooth Highway, the main Rock Creek Road, and the Hellroaring Road in Hunting District 502. In Hunting District 501, vehicle access is limited to the Daisy and LuLu Pass Roads near Cooke City and the Benbow Mine Road near Dean. The latter is merely an access road, not a road across bighorn habitat.

Bighorn Sheep Populations: From the early 1970s through the 1980s, these bighorns migrated to a low-elevation spring range along West Rosebud Creek. Typically they occupied this spring range from early April until mid-June. During this time, trend counts were relatively easy. However, the spring migration has not occurred in recent years. Counts are now dependent on high-elevation midwinter helicopter flights. During most winters, wind conditions at these high elevations preclude safe helicopter surveys.

The 2004 count of 78 bighorns was the second-highest count ever obtained for this herd (Figure 1). Included in that count were 16 lambs for a lamb: ewe ratio of 33:100, which was slightly above the long-term average ratio of 29 lambs: 100 ewes (Table 1). Since 1972, lamb survival has exceeded 40 lambs: 100 ewes only seven times.

Also since 1972, an average of 13 rams have been counted per year in the West Rosebud area. Five of these rams are ¾-curl or larger

Figure 1. Total number of bighorn sheep observed during trend surveys on the West Rosebud winter range, Hunting District 501, 1972-2004.

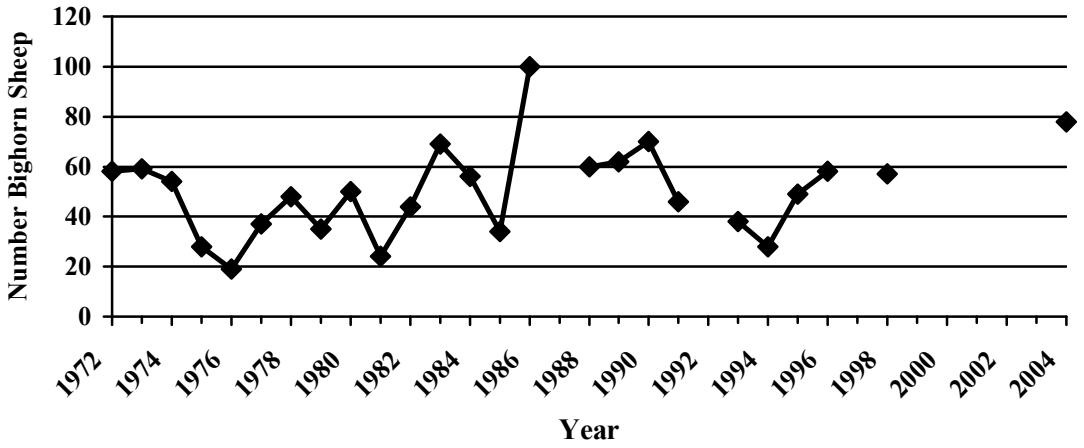

Table 1. Bighorn sheep population parameters, Hunting District 501, 1972-2004.

Year	Total	Lambs	Rams	¾+ Rams
1972	58	14	10	3
1973	59	12	14	9
1974	54	2	10	3
1975	28	3	6	2
1976	19	3	3	
1977	37	11	5	2
1978	48	10	14	5
1979	35	1	15	4
1980	50	9	13	4
1981	24	7	6	3
1982	44	11	12	6
1983	69	11	22	9
1984	56	9	20	6
1985	34	3	21	8
1986	100	19	23	6
1988	60	4	14	5
1989	62	5	18	6
1990	70	4	19	11
1991	46	3	10	3
1993	38	2	11	6
1994	28	5	4	
1995	49	11	11	4
1996	58	10	18	5
1998	57	15	6	3
2004	78	16	13	5

rams. During the 2004 count, the number of rams in each category equaled the long-term average.

The bighorn herd in Hunting District 502 appears to have peaked in the late 1970s and early 1980s when over 90 individuals were counted (Figure 2). The population remained relatively high through the late 1980s when counts stayed above 80 sheep. However, in April 1991 a late-winter blizzard blanketed the winter range with four to six feet of heavy, wet snow. There were no windblown slopes for the bighorns to forage on after this storm. Those conditions remained for more than 10 days. The result was that the following year (1992) only 19 bighorns could be counted during an intensive helicopter survey. By spring 1993, only 11 bighorns could be found.

In 2004, 41 bighorns were tallied on the Hellroaring winter range. Eighteen of these were rams, including twelve ¾-curl rams (Table 2). The lamb: ewe ratio in 2004 was only 21:100, which was well below the long-term average of 35:100. The ram: ewe ratio of 94:100 was the second highest ever recorded for this herd.

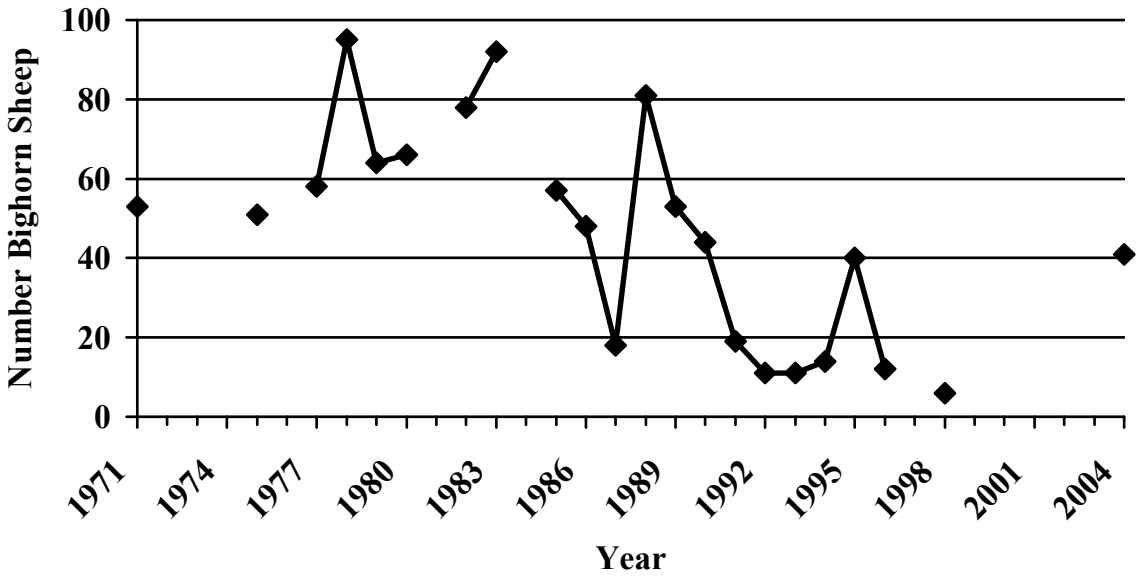

Figure 2. Total number of bighorn sheep observed during trend surveys on the Hellroaring winter range, Hunting District 502, 1971-2004.

Year	Total	Lambs	Rams	¾+ Rams
1971	53	14	3	
1975	51	6	11	3
1977	58	17	15	5
1978	95	29	20	4
1979	64	8	21	7
1980	66	7	13	3
1982	78	19	15	6
1983	92	15	22	8
1985	57	9	14	7
1986	48	4	5	2
1987	18	3	6	3
1988	81	18	16	4
1989	53	11	7	2
1990	44	2	12	
1991	19	6	4	
1992	11	4	1	
1993	11	1	2	
1994	14	3	1	
1995	40	12	3	
1996	12	2	5	
1998	26	6	7	2
2004	41	4	18	12

Table 2. Bighorn sheep population parameters, Hunting District 502, 1971-2004.

Recreation Provided: From the late 1950s through 1974, the entire Beartooth Mountain Range from the Clarks Fork River to the Boulder River was included in one large hunting district (Hunting District 501). In 1975, this area was broken into Hunting Districts 500, 501, and 502. These hunting districts are managed as part of Montana's "unlimited" areas (as had been old Hunting District 501). In these unlimited areas, license sales are not limited but harvest is controlled through the use of a quota on the number of ¾-curl rams that can be taken. When a ram is harvested, the successful hunter must report the kill to FWP within 48 hours. When the quota is reached in a hunting district, the season is closed on 48 hours notice.

Since 1975, an average of 76 bighorn licenses have been issued each year in Hunting District 501 (Table 3). However, typically only about two-thirds of the license holders actually participate in a hunt on an annual basis. The

Table 3. Number of licenses issued and subsequent harvest, Hunting District 501, 1975-2007[1].

Year	Licenses Issued	Hunters Hunting	Total Harvest	% Success	Effort[2]
1975	112	88	1	1	704
1976	94	63	3	5	168
1977	89	73	2	3	256
1978	84	65	2	3	227
1979	108	79	1	1	553
1980	89	46	3	7	138
1981	93	63	0	0	-
1982	54	26	2	8	104
1983	75	38	3	8	51
1984	62	44	3	7	103
1985	52	38	2	5	114
1986	99	74	2	3	149
1987	109	47	3	6	92
1988	63	35	3	9	48
1989	54	35	4	11	31
1990	63	49	3	6	66
1991	60	45	4	9	44
1992	57	48	2	4	125
1993	74	46	3	7	68
1994	54	37	2	5	112
1995	69	45	2	4	94
1996	46	33	1	3	170
1997	62	41	0	0	-
1998	66	50	1	2	288
1999	64	35	4	11	29
2000	82	61	3	5	75
2001	87	66	3	5	117
2002	81	58	3	5	165
2003	87	51	3	6	88
2004	75	57	3	5	163
2005	105	41	3	7	56
2006	75	NA	3	NA	NA
2007	NA	NA	3	NA	NA

[1] Includes former Hunting District 502 after 1999
[2] Effort = Days/ram harvested

average number of hunters afield in Hunting District 501 each year since 1975 has been 51. Between 1975 and 1992, an average of 75 bighorn licenses were sold annually for Hunting District 502 (Table 4). On average only 62% of the permit holders hunted each year.

The rams that winter in Hunting District 502 spend the summer and early fall in northern Wyoming and YNP. They are generally unavailable to hunters until late in the autumn. Older rams move into the area later than younger rams. Because of these migration patterns, the hunting season in Hunting District 502 ran from November 19 to December 15 from 1983 to 1992.

Following the 1991 die-off of bighorns in Hunting District 502, the hunting season was closed in this area beginning in 1993. The closure remained in effect through the 1999 season. Increased counts of bighorns on the winter range resulted in this area being reopened to hunting beginning in 2000. However, it was opened as a subunit of Hunting District 501 with a separate quota of one ¾-curl ram.

Hunting District 502 was reopened as a separate hunting district in 2008 with a quota of two legal rams.

Current Annual Bighorn Sheep Harvest: Since 1975, the average harvest of rams in

Year	Permits Issued	Hunters Hunting	Total Harvest	% Success	Effort[1]
1975	153	115	3	3	268
1976	115	97	0	0	-
1977	92	67	0	0	-
1978	94	73	0	0	-
1979	160	83	5	6	100
1980	53	16	2	12	56
1981	59	28	2	7	70
1982	45	27	2	7	94
1983	111	66	4	6	99
1984	81	49	4	8	47
1985	74	39	3	8	26
1986	67	34	4	12	23
1987	62	36	2	6	51
1988	51	30	1	3	158
1989	49	31	2	6	65
1990	49	31	2	6	53
1991	16	8	1	12	53
1992	29	20	1	5	85

Table 4. Number of licenses issued and subsequent harvest, Hunting District 502, 1975-1992.

[1] Effort = Days/ram harvested

Hunting District 501 has been 2.4 rams per year, which equated to an average hunter success of slightly less than 5%. Between 1975 and 1992, the ram harvest in Hunting District 502 averaged 2.1 rams per year, which equated to an average hunter success of slightly more than 4%. Since old Hunting District 502 was reopened as a subunit of Hunting District 501, a total of five rams have been harvested in this area (average = 0.6 rams per year). All of these rams were taken between 2001 and 2004.

Accomplishments: The most significant accomplishment has been the successful establishment and long-term use of the "unlimited" season type, which provides any hunter with the opportunity to hunt bighorn sheep. Only a small number of hunting districts in Montana (and no place else in the United States) offer unlimited bighorn hunting opportunity. Extremely rugged habitat combined with low-density sheep herds provides the ultimate hunting challenge.

Management Challenges: In winter, bighorn sheep are restricted to windblown ridgetops by deep snow. Snowmobile activity can be heavy on the winter ranges adjacent to the Beartooth Highway. During winter helicopter sheep surveys, snowmobile tracks are frequently observed inside the wilderness boundary. Snowmobile activity occurring on ridgetops utilized by sheep during winter may cause increased mortality in wintering sheep through several mechanisms. Snowmobiles may force sheep away from key foraging areas and cause increased energy expenditure. Snowmobile tracks may also provide a pathway for predators to access sheep normally protected by deep snow. Over time, excessive harassment of bighorns by snowmobilers could lead to abandonment of portions of their winter range. Enforcement of travel restrictions inside and outside the wilderness boundary is essential to ensure winter survival of sheep in these areas.

Population Monitoring: To monitor the bighorn population, an attempt is made to conduct annual helicopter surveys. Surveys are conducted between midwinter and early spring. The entire area occupied by bighorns during winter is flown. Bighorns are counted and classified by age and sex. Rams are also classified by age (up to three years old) and horn class. Extreme weather conditions on these high-elevation winter ranges sometimes make annual surveys impossible.

Summary of Public Comment

Public comments regarding the bighorn sheep population and its management in this hunting district indicates a high level of support for the current season structure.

Management Goal
Manage for healthy and productive bighorn sheep herds with a diverse age structure of rams at current numbers.

Habitat Objectives
Bighorns in Hunting Districts 501 and 502 spend the entire year on Forest Service lands. The vast majority of this land lies within the Absaroka-Beartooth Wilderness. No habitat improvements or manipulations will be undertaken in the wilderness area.

Habitat Management Strategies
Not applicable due to wilderness designation.

Game Damage Strategies
Since these herds are restricted to USFS lands, primarily wilderness-designated lands, game damage is not an issue.

Access Strategies
USFS access to all major trailheads in Hunting Districts 501 and 502 are adequate and secure.

Population Objectives

West Rosebud Winter Range:
1) Maintain the number of bighorn sheep observed during post-season aerial surveys between 60 and 80 sheep.

Hellroaring Winter Range:
1) Maintain the number of bighorn sheep observed during post-season aerial surveys between 40 and 60 sheep.

Population Management Strategies
Strategies to manage bighorn sheep populations are being based, in part, on how bighorn populations respond demographically within five ecological regions across Montana. Bighorn populations and therefore objectives for the various populations and subsequent monitoring programs vary across Montana and depend largely on the environment or ecological region where they occur. Hunting Districts 501 and 502 are located in the Southern Mountains Ecological Region (see discussion of ecological regions in Chapter 1), which includes high-elevation mountainous habitat throughout much of south-central Montana. Winter range habitat, winter severity, and winter forage conditions are the primary factors limiting this population. During winter bighorns are confined to narrow bands of habitat on windblown ridgetops and mountain peaks. Forage is extremely limited. To date, overpopulation has not been a concern for these herds. Numbers are maintained at low levels through natural mortality. These hunting districts have supported a harvest of two to three rams: year without reducing population viability.

Prescriptive Harvest Management

Ewes: Bighorn sheep populations are managed where necessary through limited-entry harvest of the female segment. In Hunting Districts 501 and 502, sheep populations have never reached levels that necessitate or could support ewe harvest. Natural regulation through limited winter habitat and forage holds the population at relatively low levels.

Rams: The harvest strategy for rams in these hunting districts is to have a quota that is stable over time. This is accomplished by setting the quota equal to the long-term average number of three-year-old rams seen during winter trend counts. These are the rams that will be entering the ¾-curl age class the following year. This strategy eliminates the need to constantly juggle quotas based on slight variations in recruitment in rams to the legal age class. Following this strategy the quota for Hunting District 501 has been stable for 30 years. The same strategy was followed to develop the quota for Hunting District 502 when the hunting district was reopened in 2008.

PRYOR MOUNTAINS
(Hunting District 503)

Description: The Pryor Mountains (Hunting District 503) encompass approximately 350mi^2 with 19% privately owned and 81% managed by various public land management agencies, and are located in the Prairie/Breaks ecological region. However, bighorns are restricted to an area of about 40mi^2 on the east side of the hunting district, all of which is federal land. Of this 40mi^2 60% is controlled by the National Park Service Bighorn Canyon National Recreation Area (NRA), while nearly all of the rest falls under the jurisdiction of the Bureau of Land Management (BLM). The area occupied by sheep lies west of Bighorn Lake (Yellowtail

Reservoir). Bighorns are distributed along the reservoir from the Montana-Wyoming state line on the south to Deadman Creek on the north. They are also found along both sides of Sykes Ridge, primarily south of Layout Creek. Ram groups can be found on Burnt Timber Ridge and on the southeast end of Big Pryor (Red Pryor) Mountain. The sheep occupy relatively low elevations ranging from the reservoir shore at about 3,650 feet to East Pryor Mountain at a bit less that 8,800 feet. Nearly all of the area frequented by bighorn sheep lies between 4,300 and 6,000 feet in elevation. The habitats where bighorns concentrate are among the driest sites in Montana. The closest permanent weather station to the bighorn range is at Lovell, Wyoming, where the average annual precipitation is slightly less than seven inches per year. These dry sites are dominated by Utah juniper (*Juniper osteoperma*). With a narrow band of curlleaf mountain mahogany (*Cercocarpus ledifolius*) near the state line. Wheatgrasses (*Agropyron* spp.) are the most common grass species, as well as a preferred bighorn forage. However, in this dry climate, grass plants are not common and forage production from grasses is poor.

Public Access: Because all of the land occupied by bighorn sheep is in public ownership, excellent access is available to all portions of the habitat. Vehicle access is limited to the paved road to Barry's Landing (Yellow Hill Road) and the Mystery Cave, Burnt Timber Ridge, Crooked Creek and Big Pryor (Red Pryor) Mountain roads. Most of these roads are only accessible to four-wheel-drive vehicles.

Bighorn Sheep Populations: During the winter of 1973, Wyoming Game and Fish Department personnel relocated bighorns from the Whiskey Basin herd into the north end of the Bighorn Mountains. In 1975, six to eight of these sheep moved 10 to 12 miles, crossed Bighorn Lake, and recolonized historical bighorn habitat at the Bighorn Canyon NRA. During the winters of 1971 and 1974, FWP relocated a total of 80 bighorns into the Bear Canyon area of Big Pryor Mountain with transplants of 35 sheep from the Sun River in 1971 and 45 sheep from the Sun River in 1974. While none of these bighorns were ever observed on the Bighorn Canyon NRA, they were seen within about 5 miles. Further, genetic work by Fitzsimmons (1992) suggested that genetic contributions from Montana bighorns might explain the genetic diversity of the Pryor Mountain population. In any case the Pryor herd grew at near the maximum potential rate for bighorns and numbered between 75 and 80 sheep in the spring of 1989 (Coates 1989). Kissel (1996) estimated (using the population estimation program NOREMARK) that the population had increased to slightly over 200 animals during 1993 to 1994 and may have then declined to 125 by 1996. Schoenecker et al. (2003) estimated (using the Idaho Sightability Model) the herd size at 94 to 95 animals in 1998 and 1999. While these two population estimators are not strictly comparable, there is agreement that the herd declined in size. Schoenecker et al. (2003) estimated that the population increased to about 115 bighorns in 2001 and remained stable through 2003. Trend counts would indicate a declining herd through 2004 followed by an increase through 2008 (Figure 1). There has been a steady increase in the number of lambs counted since 2000, indicating a healthy population (Table 1).

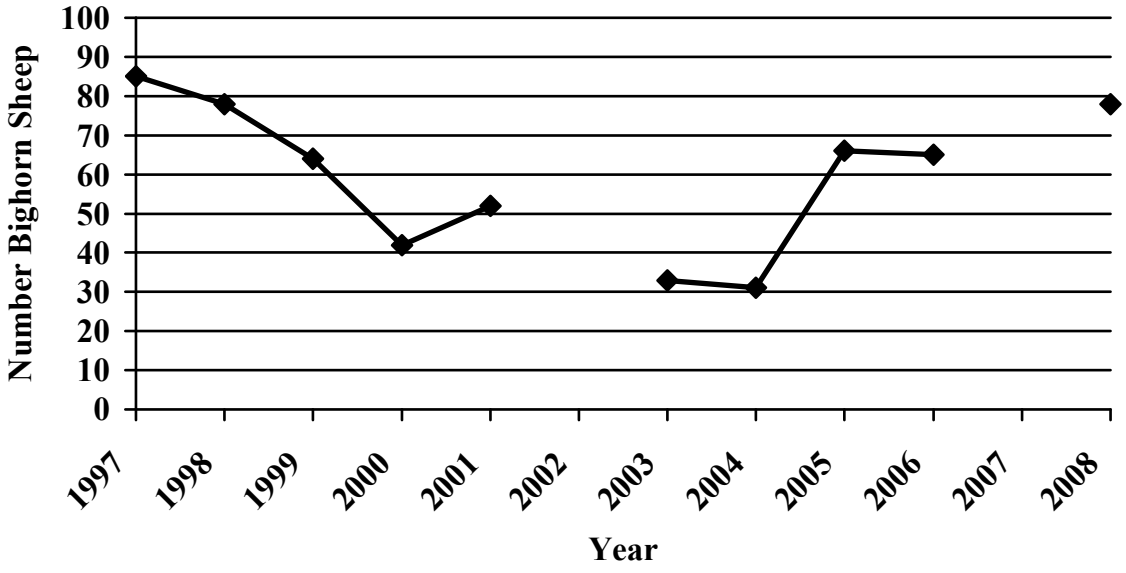

Figure 1. Total number of bighorn sheep observed during trend surveys on the Pryor Mountain bighorn range, Hunting District 503, 1997-2008.

Table 1. Bighorn sheep population parameters, Hunting District 503,

Year	Total	Lambs	Rams	¾+ Rams
1997	85	6	22	14
1998	78	13	12	7
1999	64	15	10	5
2000	42	1	11	1
2001	52	6	8	2
2003	33	7	4	1
2004	31	4	6	0
2005	66	8	23	11
2006	65	9	16	8
2008	78	15	20	10

Recreation Provided: Hunting District 503 has been open to hunting of ¾-curl rams on a limited-entry basis since 1990 (Table 2), when hunting was initiated with the issuance of two licenses. As the population increased, the number of licenses was increased to four in 1994. Then as bighorn sheep numbers declined and lamb recruitment decreased, the number of licenses issued was reduced to one from 2000 to 2004. High counts of ¾-curl rams along with increased lamb recruitment resulted in an increase in the number of licenses in 2005 to three. Beginning in 2008, these three licenses were made valid for either-sex bighorns rather than only for ¾-curl rams.

The overlap of the bighorn range with the Pryor Mountain Wild Horse Range, combined with good access by virtue of public ownership, has made the area popular for wildlife viewing during all seasons of the year. Popular areas for viewing bighorn sheep include Devil's Canyon Overlook, Booz Canyon, and the Barry's Landing/Hillsboro area.

Current Annual Bighorn Sheep Harvest: Between 1990 and 2007, a total of 42 licenses have been issued and 41 rams have been harvested (Table 2). That equates to an overall success rate of 98%. In recent years three rams have been taken annually by three license holders.

Table 2. Number of licenses issued and subsequent harvest, 1990-2007.

Year	Permits Issued	Hunters Hunting	Total Harvest	% Success	Effort
1990	2	2	2	100	1
1991	2	2	2	100	13
1992	2	2	2	100	12
1993	2	2	2	100	9
1994	4	4	4	100	7
1995	4	4	4	100	9
1996	4	4	4	100	18
1997	4	4	4	100	6
1998	2	2	2	100	7
1999	2	2	2	100	8.5
2000	1	1	0	0	-
2001	1	1	1	100	11
2002	1	1	1	100	15
2003	1	1	1	100	13
2004	1	1	1	100	5
2005	3	3	3	100	NA
2006	3	3	3	100	NA
2007	3	3	3	100	NA

Accomplishments: This population of bighorn sheep has increased relatively rapidly since colonizing the area in 1976. The fall of 2007 will be the 18th year that sheep hunts have been conducted in this hunting district. During that time only one hunter chose not to harvest a ram. Coates (1989) successfully completed a MS degree describing the habitat utilization and interspecific interactions of bighorns on the wild horse range. Kissel (1996) followed up with a PhD study of the competitive interactions between mule deer, bighorn sheep, and wild horses. Schoenecker et al. (2003) and Roelle (2003) reported on additional bighorn population and habitat studies conducted by the U.S. Geological Survey for the Bighorn Canyon NRA.

Management Challenges: Maintaining separation of wild sheep and domestic goats to avoid transmission of disease between the two species may be the greatest management challenge in the foreseeable future. A domestic goat "rancher" has started an operation on the state line in Wyoming just five to six miles from a bighorn ram winter concentration area. This operation currently involves about 75 unherded and unfenced goats. The presence of these goats not only poses a disease threat to the bighorns, but they also have forced FWP to abandon plans to relocate additional bighorns to the east end of Big Pryor Mountain. Of further concern is Wyoming Game and Fish's use of goats for weed control on the Yellowtail Wildlife Habitat Management Area just south of Horseshoe Bend. Several thousand goats are herded in this area during the summer months. Montana's bighorns have been observed within five miles of this area during the period of goat occupation.

A substantial portion of the occupied bighorn habitat in this hunting district overlaps the Pryor Mountain Wild Horse Range. To a large degree, range condition of bighorn habitat is determined by grazing impacts from wild horses. Recent range studies have shown the wild horse range to be badly overgrazed and in poor range-vegetative condition.

Population Monitoring: To monitor the bighorn population, aerial surveys are conducted annually using a helicopter. Surveys are generally conducted in early winter. The entire area occupied by bighorns during winter is flown. Bighorns are counted and classified by age and sex. Rams are also classified by age (up to three years old) and horn class.

Summary of Public Comment

Public comments regarding the bighorn sheep population and its management in this hunting district indicates a high level of support for the current season structure.

Management Goal

Manage for a healthy and productive bighorn sheep herd with a diverse age structure of rams at current numbers. Pursue opportunities to expand bighorn distribution and numbers on Big Pryor Mountain.

Habitat Objectives

Encourage improvement of habitat conditions on BLM and NPS lands so that vegetation conditions on these ranges provide adequate forage for bighorns and other wildlife.

Habitat Management Strategies

Continue to work with BLM to keep wild horse numbers within the ecological carrying capacity of the range.

Game Damage Strategies

Since this herd is restricted to public lands, game damage is not an issue.

Population Objectives

Maintain the number of bighorn sheep observed during post-season aerial surveys between 70 and 100 sheep. Pursue relocation of ewe and lamb groups to Big Pryor Mountain with the goal of maintaining 50 to 75 additional bighorns in that area.

Population Management Strategies

Strategies to manage bighorn sheep populations are being based, in part, on how bighorn populations respond demographically within five ecological regions across Montana. Bighorn populations and therefore objectives for the various populations and subsequent monitoring programs vary across Montana and depend largely on the environment or ecological region where they occur. Hunting District 503 is located in the Prairie/Breaks Ecological Region (see discussion of ecological regions in Chapter 1). Forage is extremely limited because of the desert-like conditions that result from low levels of precipitation. The population appears to have stabilized at moderate levels after peaking out in the early 1990s. Numbers are maintained at these moderate levels through natural mortality

and limited lamb survival. This hunting district will support a harvest of two to three rams: year without reducing population viability at the current herd size.

Prescriptive Harvest Management

Ewes: Bighorn sheep populations are managed where necessary through limited-entry harvest of the female segment. In Hunting District 503, sheep populations have never reached levels that necessitate or could support ewe harvest. Natural regulation through limited winter habitat and forage holds the population at relatively low levels.

Rams: The long-term harvest management strategy goal is to set the ram license level equal to the average number of three-year-old rams seen during winter trend counts. These are the rams that will be entering the ¾-curl age class the following year. This strategy eliminates the need to constantly juggle license numbers based on slight variations in ram recruitment.

FERGUS, LITTLE ROCKIES, MIDDLE MISSOURI BREAKS, CHOUTEAU-BLAINE-PHILLIPS (MISSOURI RIVER BREAKS COMPLEX)

(Hunting Districts 482, 620, 622, 680)

Description: The Missouri River Breaks Complex, comprised of bighorn sheep Hunting Districts 482, 620, 622 and 680, represents approximately 3,863mi². Approximately 475mi² (12%) of these hunting districts are currently occupied by bighorn sheep during some portion of the year. The higher-quality sheep habitat includes the steep-walled canyons and adjacent ridges and benches (breaks) of the Missouri River, primarily between the mouth of the Judith River on the west and Timber Creek on the east.

Twenty-one percent of the area occupied by bighorn sheep is private land and 72% is federal land: 58% managed by the Bureau of Land Management (BLM) and 14% managed by the U.S. Fish and Wildlife Service (USFWS). Six percent is State Trust land, and less than 1% is Fort Belknap Indian Reservation tribal land. Most of the BLM land is located within the Upper Missouri River Breaks National Monument. All USFWS land is within the Charles M. Russell National Wildlife Refuge (NWR).

The Missouri River Breaks bighorn sheep use many different areas throughout the year, but there is no distinctly recognized winter range. Cattle graze the less steep bench tops and river and creek bottoms on privately owned and BLM-managed federal lands. Small grains are grown on some of the larger, privately owned benches. There are six Wilderness Study Areas (WSAs) on BLM lands (five within Hunting Districts 680 and 482 and one within Hunting District 622) and two Proposed Wilderness Areas on the Charles M. Russell NWR in Hunting District 622 that lie within occupied sheep range.

Public access: The Missouri River Breaks provides a diversity of hunting experiences, including motorized hunting on portions of the periphery, walk-in hunting on the interior, and access by boat along the Missouri River and Fort Peck Reservoir. Access to the public lands is somewhat restricted as most roads to public lands cross privately owned lands. At this point in time, many private landowners allow public access across their property to public lands having sheep. Some also allow access to sheep on their own property. In addition, there are numerous public access roads that do provide access to sheep habitat on BLM land (the Whiskey Ridge, Stafford Ferry, Sunshine Ridge, DY Trail, and Lower Two Calf Roads in Hunting District 482; the Zortman and Landusky Roads in Hunting District 620; the Telegraph Creek, Kill Women Creek, and Plum Creek Roads in Hunting District 622; and the Gist Ranch Road and the Lloyd Road in Hunting District 680). The Upper Missouri River Breaks National Monument travel plan will close some spur roads in order to provide habitat security for sheep. Ongoing efforts are being made by FWP to enter into access agreements with private landowners to continue to provide public access across their property to important public lands. All motorized trails have been closed on Proposed Wilderness Areas within the Charles M. Russell NWR, however, the Missouri River and Fort Peck Reservoir also provide access to BLM and USFWS lands.

Bighorn Sheep Populations: Throughout the 1800s early explorers, pioneers, and river travelers commonly observed bighorn sheep along the Missouri River in what is now eastern and central Montana. By the early